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DYKEMA GOSSETT PLLC  
39577 WOODWARD AVENUE  
SUITE 300  
BLOOMFIELD HILLS, MI 48304-5086

EXAMINER

BARTH, VINCENT P

ART UNIT PAPER NUMBER

2877

DATE MAILED: 08/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/630,479

Applicant(s)

CHANG, TZYU-SHUI

Examiner

Vincent P. Barth

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 August 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3-5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. The drawings in Figure 1 are objected to because of an informality, in that the lead line from the sensor 30 is not directed from the number to the body of the object to which it should identify. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claim 1, 17 and 18 are rejected under 35 U.S.C. §102(b) as being anticipated by *Milnes*, U.S. Patent No. 3,187,185 (1 Jun., 1965).

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4. *Milnes* discloses a device for: (i) determining the surface contours of an object, such as high-temperature metals in metal foundries, wherein the object or metal is at such temperatures that it will have a self emitted EMR, described therein as “red-hot steel” (col. 1, ln. 69). *Milnes* further discloses: (ii) an EMR source, in the form of a light (col. 1, ln. 53), and (iii) a EMR detector or sensor in the form of a camera (col. 1, ln. 57). *Milnes* further discloses: (iv) that the system may project a different wavelength EMR upon the object than the object’s self-emitted wavelength (col. 1, lns. 65-69). The example provided therein is that when the sample is glowing red-hot (i.e. self-emitting in the red spectrum of visible light), a blue or ultra-violet beam may be incident upon it, such that the self emitting EMR is distinguishable.

5. Claim 1 contains the elements of *Milnes* discussed in the paragraph above, in particular elements (i)-(iv). Claim 1 calls for a device producing an image from an object with a temperature dependent, dominant, self-emitting EMR, which corresponds to (i) above, the imaging of the “red-hot steel” or other high-temperature objects. In this context, the “dominant” self-emitting radiation in *Milnes* is red, and such is clearly temperature dependant, since the metal will emit differently at different temperatures. Claim 1 further calls for an EMR source and detector, for which the light and camera components in (ii) and (iii) above correspond. Finally, Claim 1 describes a system in which the incident EMR has a wavelength different from the object’s self-emitted EMR, which corresponds to item (iv) above, wherein *Milnes* provides the example discussed above. Accordingly, the device in Claim 1 is anticipated by *Milnes*.

6. Claims 17 and 18 contain all of the limitations in Claim 1, but seek to add further limitations in that the device contains a plurality of EMR sources and sensors. *Milnes* provides a system in which both the surface contours, and the thickness of the object can be measured,

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therefore a variety of configurations are within the scope of its disclosure. In particular, see Figure 7 of *Milnes*, in which a plurality of EMR sources in the form of lights, as well as sensor in the form of cameras or television cameras are contained therein. Accordingly, Claims 17 and 18 are anticipated by *Milnes*.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-10, 15 and 16 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Milnes*, U.S. Patent No. 3,187,185 (1 Jun., 1965), and in view of general principals and practices in the art.

9. Claim 2 contains all of the limitations in Claim 1, but seeks to add a further limitation in that a video recorder is added to the optical system. *Milnes* discloses a system of television cameras, however, it does not explicitly include video recorders attached to said cameras. However, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to add such an element. It is commonly known that a video camera may be attached to a television camera to record events. Accordingly, official notice is taken of these general principles and practices, and therefore Claim 2 is obvious under 35 U.S.C. §103(a) over

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*Milnes* in view of these findings. See, MPEP §2144.03, and In re Malcolm, 129 F.2d 529, 54 U.S.P.Q. 235 (1942).

10. Claim 3 contains all of the limitations in Claim 1, but seeks to add a further limitation in that the EMR detector is a CCD. *Milnes* discloses a system of television cameras, however, it does not explicitly include a CCD as a substitute for said cameras. However, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to make such a substitution from the prior art in *Milnes*. It is commonly known in the art that a CCD may be substituted for a television camera. Therefore, such substitution is an obvious design choice consistent with *Milnes*. Accordingly, official notice is taken of these general principles and practices, and therefore Claim 3 is obvious under 35 U.S.C. §103(a) over *Milnes* in view of these findings. See, MPEP §2144.03, and In re Malcolm, 129 F.2d 529, 54 U.S.P.Q. 235 (1942).

11. Claim 4 contains all of the limitations in Claim 1, but seeks to add a further limitation in that the light beam incident on the surfaces should be at least one light from a group consisting of metal-halite lamps, flourescent lamps, and xenon lamps. *Milnes* has as one preferred embodiment generically describing a light source, although additional light sources are permitted as well. The Specification does not disclose the reason for limiting the types of light to metal-halite lamps, flourescent lamps, and xenon lamps, when other art recognized equivalents may be suitable for the same purpose, and as such is a non-critical limitation. Moreover, the last paragraph at page 8 of the instant Application it is stated that other types of light sources may be used, as long as the desired wavelengths may be generated. Accordingly, the limitation of the group of lights to only metal-halite lamps, flourescent lamps, and xenon lamps does not patentably distinguish over the prior art of *Milnes*.

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12. Claim 5 contains all of the limitations in Claim 1, but seeks to add a further limitation in that a laser is used as the EMR source. *Milnes* discloses a system in which the light source is described generically. However, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to make a substitution with a laser from the prior art in *Milnes*. It is commonly known in the art that a laser may be used as a light source, and this would be a choice suggested by *Milnes* in the context its disclosure. *Milnes* discloses a system wherein the dominant frequency of the self-emitting radiation from the object is to be distinguishable from the source light incident on said object. Thus, a narrow band of incident light, either filtered from a broad spectrum source, or a narrow band source would be used, whereby the latter design choice could be met by a laser. Therefore, such substitution is an obvious design choice consistent with *Milnes*. Accordingly, official notice is taken of these general principles and practices, and therefore Claim 3 is obvious under 35 U.S.C. §103(a) over *Milnes* in view of these findings. See, MPEP §2144.03, and In re Malcolm, 129 F.2d 529, 54 U.S.P.Q. 235 (1942).

13. Claim 6 contains all of the limitations in Claim 5, but seeks to add a further limitation in that a zone of illumination is projected by the laser. It is commonly known in the art that when a laser is used as a point light source, a various techniques may be used to illuminate an area larger than the point, such as a “zone of illumination”, as are demonstrated at page 9 in the instant Application. Therefore, such substitution is an obvious design choice consistent with *Milnes*. Accordingly, official notice is taken of these general principles and practices, and therefore Claim 6 is obvious under 35 U.S.C. §103(a) over *Milnes* in view of these findings. See, MPEP §2144.03, and In re Malcolm, 129 F.2d 529, 54 U.S.P.Q. 235 (1942).

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14. Claim 7 contains all of the limitations in Claim 5, but seeks to add a further limitation in that mirrors direct the EMR source. *Milnes* discloses a system of light sources, however, it does not explicitly include mirrors to direct them. However, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to add such an element. It is commonly known in the field of optics that mirrors may be used to direct light sources.

Accordingly, official notice is taken of these general principles and practices, and therefore Claim 2 is obvious under 35 U.S.C. §103(a) over *Milnes* in view of these findings. See, MPEP §2144.03, and In re Malcolm, 129 F.2d 529, 54 U.S.P.Q. 235 (1942).

15. Claim 8 contains all of the limitations in Claim 5, but seeks to add a further limitation in that structured illumination is provided. *Milnes* discloses a system in which contours of the object as well as thickness are measured. Towards this end, multiple lines of light, and other configurations of light are created from the beams incident upon the object (col. 2, lns. 3-13). This includes a measuring beam, and a reference beam (col. 2, lns. 12-13). The description of these beams found in *Milnes* are consistent with the description at page 9 in the instant Application. Accordingly, the proposed limitation in Claim 8 is not patentably distinguishable over the prior art in *Milnes*.

16. Claim 9 contains all of the limitations in Claim 1, but seeks to add a further limitation in that the detector detects multiple wavelengths of reflected EMR. *Milnes* discloses a system in which a high-temperature object may be imaged with video cameras, and in which a wavelength different from the self-emitted wavelength may be directed at the object to be distinguishable therefrom. Thus, the ability to image the object is inherent in the system, since a variety of wavelengths may be required based on the range of self-emitting wavelengths, versus the range



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of source wavelengths which must differ therefrom. Accordingly, the proposed limitation in Claim 9 is not patentably distinguishable over the prior art in *Milnes*.

17. Claim 10 contains all of the limitations in Claim 3, but seeks to add a further limitation in that the CCD is sensitive in the range of 175 to 1000 nm. *Milnes* discloses a system in which a high-temperature object may be imaged with video cameras, and in which a wavelength different from the self-emitted wavelength may be directed at the object to be distinguishable therefrom. Moreover, by virtue of the high temperature of the object as exemplified in *Milnes*, that is, glowing “red-hot” (col. 1, ln. 69), it will necessarily emit in a variety of wavelengths, including the range of 175 to 1000 nm (i.e., mid UV to near IR). Thus, the CCD must have the ability to image the objects in a variety of wavelengths, based on the range of self-emitting wavelengths, versus the range of source wavelengths which must differ therefrom. Accordingly, the proposed limitation in Claim 10 is not patentably distinguishable over the prior art in *Milnes*.

18. Claim 15 contains all of the limitations in Claim 1, but seeks to add further limitations in that the EMR source is modulated, and the detector demodulates the EMR. *Milnes* discloses a system of light sources, however, it does not explicitly include mirrors to direct them. However, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to add such an element. It is commonly known in the field of optics, that modulation of the incident beam, and demodulation of the reflected beam received may be used to distinguish background radiation, or in this case self-emitted radiation, from the source light incident upon the object. Accordingly, official notice is taken of these general principles and practices, and therefore Claim 2 is obvious under 35 U.S.C. §103(a) over *Milnes* in view of these findings. See, MPEP §2144.03, and In re Malcolm, 129 F.2d 529, 54 U.S.P.Q. 235 (1942).

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19. Claim 16 contains all of the limitations in Claim 1, but seeks to add further limitations in that the EMR source is pulsed. The Specification does not draw an appropriate distinction between the pulsing of the light source, as in the instant claim, and modulation of the light source, as in Claim 16. Nevertheless, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to add such an element. It is commonly known in the field of optics, that modulation of the incident beam, and demodulation of the reflected beam received may be used to distinguish background radiation, or in this case self-emitted radiation, from the source light incident upon the object. Therefore, since the modulation and the pulsing of the source beam are functionally equivalent, the same principle applies. Accordingly, official notice is taken of these general principles and practices, and therefore Claim 2 is obvious under 35 U.S.C. §103(a) over *Milnes* in view of these findings. See, MPEP §2144.03, and In re Malcolm, 129 F.2d 529, 54 U.S.P.Q. 235 (1942).

20. Claims 11-13, and 19 are rejected under 35 U.S.C. §103(a)) as being unpatentable over *Milnes*, U.S. Patent No. 3,187,185 (1 Jun., 1965), in view of King, U.S. Patent No. 5,995,008 (30 Nov., 1999), and further in view of general principals and practices in the art.

21. Claim 11 contains all of the limitations in Claim 1, but seeks to add a further limitation in that an interference filter is placed before the sensor. *Milnes* discloses a filter which may be interposed between the workpiece and the sensing device, such that the visibility is enhanced (col. 1, ln. 71 to col. 2, ln. 2). This disclosure of a filter is generic in form, and should be read in the context of that same paragraph in which the workpiece is at high temperatures, and thereby emitting a characteristic EMR. Therefore, having shown above that Claim 1 is anticipated by *Milnes*, it would have been obvious to one of ordinary skill in the art at the time of the invention

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was made to add a filter, including an interference filter. The reason for such, is that it is commonly known in the field of optics, and a general practice and procedure in the art, that filters may be used to reduce the effects of undesired EMR frequencies before such are incident upon a sensor, so as to achieve meaningful and more accurate results for later analysis. King discloses that interference filters have been used in imaging and spectral analysis in the context of flame and fire detectors (col. 2, ln. 49). Accordingly, official notice is taken of these general principles and practices, and therefore Claim 11 is obvious over *Milnes*, in view of King, and these findings. See, MPEP §2144.03, and In re Malcolm, 129 F.2d 529, 54 U.S.P.Q. 235 (1942).

22. Claim 12 contains all of the limitations in Claim 11, but seeks to add a further limitation in that an interference filter is placed before the sensor, and that said filter blocks substantially all of the self-emitted EMR. *Milnes* discloses a filter which may be interposed between the workpiece and the sensing device, such that the visibility is enhanced (col. 1, ln. 71 to col. 2, ln. 2). This disclosure of a filter is generic in form, and should be read in the context of that same paragraph in which the workpiece is at high temperatures, and thereby emitting a characteristic EMR. Therefore, having shown above that the introduction of an interference filter in Claim 11 is obvious, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to add a filter, including an interference filter, and that an obvious design choice would be to block the self-emitted EMR. The reason for such is that it is commonly known in the field of optics, and a general practice and procedure in the art, that filters may be used to reduce the effects of undesired EMR frequencies before such are incident upon a sensor, so as to achieve meaningful and more accurate results for later analysis. King discloses that interference filters have been used in imaging and spectral analysis in the context of flame and

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fire detectors (col. 2, ln. 49). Accordingly, official notice is taken of these general principles and practices, and therefore Claim 12 is obvious over *Milnes*, in view of King, and these findings.

See, MPEP §2144.03, and In re Malcolm, 129 F.2d 529, 54 U.S.P.Q. 235 (1942).

23. Claim 13 contains all of the limitations in Claim 1, but seeks to add a further limitation in that a cut-off filter is placed before the sensor. *Milnes* discloses a filter which may be interposed between the workpiece and the sensing device, such that the visibility is enhanced (col. 1, ln. 71 to col. 2, ln. 2). This disclosure of a filter is generic in form, and should be read in the context of that same paragraph in which the workpiece is at high temperatures, and thereby emitting a characteristic EMR. Therefore, having shown above that Claim 1 is anticipated by *Milnes*, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to add a filter, including a cut-off filter. The reason for such, is that it is commonly known in the field of optics, and a general practice and procedure in the art, that filters may be used to reduce the effects of undesired EMR frequencies before such are incident upon a sensor, so as to achieve meaningful and more accurate results for later analysis. King discloses the use of a cut-off filter in imaging and spectral analysis in the context of flame and fire detectors (col. 4, lns. 40-43). Accordingly, official notice is taken of these general principles and practices, and therefore Claim 13 is obvious over *Milnes*, in view of King, and these findings. See, MPEP §2144.03, and In re Malcolm, 129 F.2d 529, 54 U.S.P.Q. 235 (1942).

24. Claim 19 contains the elements of *Milnes* discussed in paragraph 4 above, in particular elements (i)-(iv). Claim 19 calls for a device producing an image from an object with a temperature dependent, dominant, self-emitting EMR, which corresponds to (i) above, the imaging of the “red-hot steel” or other high-temperature objects. In this context, the “dominant”

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self-emitting radiation in *Milnes* is red, and such is clearly temperature dependant, since the metal will emit differently at different temperatures. Claim 19 further calls for a video camera, which corresponds to the television camera in item (iii) above, and a light source a light source attached to said video camera. *Milnes* includes a light source in item (ii) above, the position of which is with the range of obvious design choices in the device. Claim 19 also calls for an interference filter. *Milnes* discloses a filter which may be interposed between the workpiece and the sensing device, such that the visibility is enhanced (col. 1, ln. 71 to col. 2, ln. 2). This disclosure of a filter is generic in form, and should be read in the context of that same paragraph in which the workpiece is at high temperatures, and thereby emitting a characteristic EMR. Therefore, having shown above that Claim 1 is anticipated by *Milnes*, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to add a filter, including an interference filter. The reason for such, is that it is commonly known in the field of optics, and a general practice and procedure in the art, that filters may be used to reduce the effects of undesired EMR frequencies before such are incident upon a sensor, so as to achieve meaningful and more accurate results for later analysis. King discloses that interference filters have been used in imaging and spectral analysis in the context of flame and fire detectors (col. 2, ln. 49). Accordingly, official notice is taken of these general principles and practices, and therefore Claim 19 is obvious over *Milnes*, in view of King, and these findings. See, MPEP §2144.03, and In re Malcolm, 129 F.2d 529, 54 U.S.P.Q. 235 (1942).

25. Claims 14 is rejected under 35 U.S.C. §103(a) as being unpatentable over *Milnes*, U.S. Patent No. 3,187,185 (1 Jun., 1965), in view of *Fishman*, U.S. Patent No. 4,744,407 (17 May, 1988).

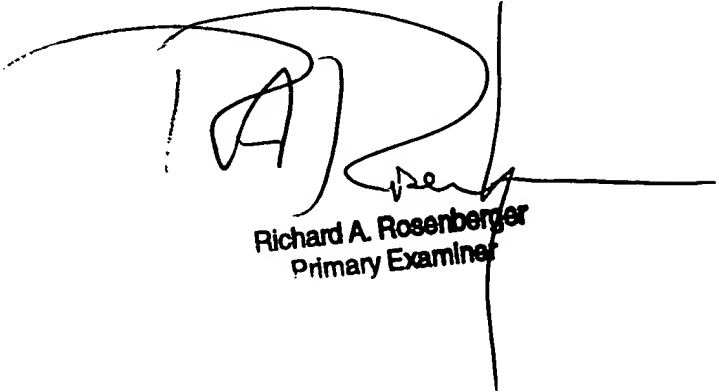
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26. Claim 14 contains all of the limitations in Claim 1, but seeks to add a further limitation in that an air flow controller provides air to the object to remove air density distortion. As discussed above, *Milnes* discloses, *inter alia*, a system in which an object, such as high-temperature metal in a metal foundry, is at such temperatures that it will have a self emitted EMR, described therein as “red-hot steel” (col. 1, ln. 69). Moreover, as is in the nature of such high-temperature environments in metal foundries and the like, the heat emitted from the object causes disturbances in the air, and thus optical distortions resulting therefrom. The Specifications at p. 11 of the Application states that such air flow controller “decreases the temperature gradient around the hot object”, indicating that cool air at a sufficient pressure to meet the desired flow rate would be introduced. *Fishman* involves a system in which molten metals must be observed in a foundry, and wherein “chilled air” is introduced to prevent “interference” with the vision of the camera (col. 4, lns. 61-66). Although the language of *Fishman* does not explicitly state that the “chilled air” reduces optical distortion, it is clear from the context of a camera imaging molten metals, that the temperature of the air serves this purpose, and that no other reasons are suggested. Moreover, the chilled air or other inert gas are introduced at a “positive pressure”, again indicating from the context that a flow of air at an appropriate rate passing the hot object is maintained (col. 4, ln. 64). Therefore, *Fishman* suggests that when imaging an object at sufficiently high temperatures that optical distortion occurs, one would introduce chilled air passing the object at an appropriate flow rate to control such effects. Accordingly, the addition of such an element to the device in Claim 1 would be obvious to one of ordinary skill in the art at the time of invention.

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***CONCLUSION***

27. Applicant's Claims 1-19 are rejected based on the reasons set forth above.
28. Applicant's Drawings in Figure 1 are objected to for the reasons set forth above.
29. Any inquiries concerning this communication from the examiner should be directed to Vincent P. Barth, whose telephone number is 703-605-0750, and who may be ordinarily reached from 8:30 a.m. to 5:00 p.m., Monday through Friday.
30. If attempts to reach the examiner prove unsuccessful, the examiner's supervisor is Frank G. Font, who may be reached at 703-308-4881.
31. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.



Richard A. Rosenberg  
Primary Examiner